Notebook, N-10-09-29

Book # 1
Hard Record Blank
Experiments

Rome Co.,
MFG. STATIONERS,
69 FULTON STREET,
NEW YORK.
45009

029.4

Edison Laboratory

Petit =

I want to get a very hard recording record, work on celestine + Tetrachloronaphthalene same as we used for vinol, but mixed with Extra Tetrachloronaphthalene or something else that will soften it so we can cut it with a recording sapphire and run it off smooth by taking very light cuts —

Rec'd P.M.
JAN 3 1912

(7)

Recieved from Lancaster
8 lbs of Tetrachlor-Naphthalene
recently made - which he
called "Regular"

The Shellac used in the
following experiments is
the T. N. quality Exeptchene Citral
Fahrenheit thermometer used —

#1

Tetra Chlor Naph. 5 parts
Sac 5 "
Temp. 870°. Pour off at 270° Time 10 m.
Results. Throughout structure not fine
enough - Styles auto - but grooves
is Rough - looks gritty.
Have Sample

This Sample is not Colored Red
All other Samples that contains
some Stearate of Zinc are colored

#2

Tetra-cl-Nap- Parts
Lac 10
3

Rec'd P.M.
JAN 4 1912

Heated quantity up to 300°
poured off to Cool. the Shellac
Seperated from the Tetra-cl-Nap-
Repeated the same proportions as
above with addition of Pure Stearic
and a coherent mixture is the Result
This is the 2nd time same has been proven-
The resulting mass is gummy and
soft enough to be molded with slight pressure
No Sample

#3

Rec'd P.M.
JAN 4 1912

Tried to make record
on the Phono- with blank
made in Sept- 1910 - of
#365A Dope. the Stylus
slipped over the Blank
Surface and cutting —
intermittently, a groove of even
depth was not possible —
The Stylus was shipped off almost
at the start, Examined the Blank
Surface and found particles —
Emitted etc - Which shows that the
Dope Must be Filtered more thoroughly —

Tetra-Cl-Naf will not filter through Shamoi skin

Ent'd P.M.
JAN 5 1912

## #3

| | |
|---|---|
| Tetra Cl-Naf. | 10 |
| Stera-Zinc | 2 |
| Shel | 20 |

Melt the first two raise temp to 300° add Shellac gradually stirring briskly all the time - when all Shel - has been added and temp is 300° Pour off - Result is good mixture - Coherent & slightly Elastic - tough - But Contains a large quantity of air holes Hair Sample

## #4

| | |
|---|---|
| Tetra-Cl-Naf | 10 |
| Stera Zinc | 1½ |
| Shellk | 20 |

Made same as #3
Result - a shade lighter - little more wax separates
No other noticeable difference
Just as many air holes Hair Sample

# #5

| | |
|---|---|
| Tetra-Cl. Nap | 10 |
| Stera Zinc | 1 |
| Shellac | 20 |

Made Same as #3
Result a Shade lighter than #4
More were separates and more air holes than sample #4
This Samples is softer than #6 which is the same formulae except the quality of Shellac

# #6

| | |
|---|---|
| Tetra. Cl. Nap | 10 |
| Stera Zinc | 1 |
| 25# Shellac | 20 |

Made Same as #3
a Shade lighter than #5 — Proof that there is a difference between the 25# and the T.N. Shellac

# #7 — This is Same as Obs #365A

| | |
|---|---|
| Tetra. Cl. Nap | .5 |
| Stera Zinc | ½ |
| Shellac | 1.5 |

The Color of this Samples is Red and the #8 which is the old #365 Dope is Brown

Rec'd P.M.
JAN 5 1912

#8

Some old #365-A Soap remelted and poured off for comparison with the same formula to-day for the purpose of testing out the present quality of Jetica-Cl-Naps and Shellac (The color of this is brown #7 is Red and is the same formula except quality of Lac

#9

| | |
|---|---|
| Jetica-Cl-Naps | 5 |
| Stora Zinc | 1/2 |
| T. N. Shellac | 15 |

Same formula as #7 the only difference in the quality of Shellac The Sample is clearer

Rec'd P.M.
JAN 5 1912

#10.

Stera - Cl - Nap - 5-
Stera - Amin 1/2

J.N. Shellac that has been Dissolved in Denatured alcohol and filtered through paper and afterward Condensed by distillation and finally, drawn the last traces of alcohol by means of putting the soft Shellac in water and forcing steam into the water - 15 Parts

Full of pin holes - Hard & tough

The formula is same as #9
the Sample is a Shade darker -
Hardness & toughness Pin holes
show the same as #9. except
on the tab of the button which
shows a considerable more blisters

during the making some smell
of alcohol was noticeable -

# 11

Tetra-Cl. Nap 5
Stera Zinc 3
T.N. Lac 7

Many Blow Holes — More gumming than #12

# 12

Tetra Cl. Nap- 5
Stera Zinc 4
Shells - 10

Cuts ... chips - But dry - Some air holes - Try to break air holes by making mixture thinner Fairs

# 13

Same as above with addition of Nitrotoluol -

N.S. Nitrotoluol Expands on cooling also creates Gas Bubbles - removes the mass readily + soft

Judging from the above samples it seems that another material must be found which will eliminate the gaining or blistering of the Compound Tetra-il-nap. + Ebell- that material must be of a nature that will not make the product mealy nor sticky-

The following experiments are for the purpose of finding a finning material that will melt Nitrated Cotton. The ingredients which will melt Cotton are Camphor Mono-bromated Mono-alphanitro-naphtalene Nitrato-luol (Para)

Soluble Cotton dissolved in Hot monobromated Camphor shows up a semi-transparent mass of waxy nature but tough - after 48 hours the same sample has disintegrated to a mealy or grainy mass much softer than when first made.

Synthetic Camphor melted and Soluble Cotton dissolved therein produces a soft Rubbery mass

Soluble Cotton dissolved into Melted Nitronaphthalene produces a Soft Rubbery - mass

Soluble Cotton dissolved into Melted Nitrotoluol produces a Soft Rubbery mass

Rec'd P.M. as follows

JAN 15 1918

Made splendid with Dopa

Tartar Cl. Nap. 100
Zinc Stearate 10
R+P Extra Stickum 200

Liquid enough to form
Solid blanket and hard
Enough for purpose - But
Contains Bubbles or air Bases -

Also to the present have observed
that Stickum mutted with any
Solid Solvents produces
gas bubbles - which may be
detected even when the
Mixtures are Hot to any
degree of temperature - and
upon Cooling the Mixtures
the gas does not all escape
the setting of the Dopes in
impressions the bubbles
which is of course unfit
for Record Impressions

1-18-12

Remelted Blank made from formula opposite ⟶ and added Stearic and little Synthetic Camphor until nearly all the graining was removed & Poured into Mould through Filter of 3 thicknesses of Record wrapper Cotton & Flannel chilled into Ice water – the blank was little difficult coming out of the Mould –

Result – Structure – not Compact is Homous & does not shave with ease –

Entd P.M. JAN 16 1912

Made splender with Dope as follows

| | |
|---|---|
| Stearic Acid | 1 0 |
| Synthetic Camphor | 2 0 |
| R & P Extra Shellac | 2 3 0 |

Temp 260°

# 1-16-12

Remelted

Entd P.M. JAN 17 1912

| | |
|---|---|
| Stearic acid | 1 0 0 |
| Syn. Camphor | 1 0 |
| Roger + Payett Extra Shellac | 2 5 0 |

Temps. 220 to 240 for 1 hr. Stirring most of the time. Just before pouring Blank Raise temp to 270°

# 1-17-12

[21]

Boil Stearic acid with Zinc-Metal for about 8 hrs. or until the cooling and setting of it becomes translucent or Semi-transparent. Will call this Zinc-Stearate

Melted Zinc-Stearic 1 Part
Tetra-Ch. Mag- 1 "
little quina Damar only
Enough to allow the Stearic-
& Tetra to Crystalize on cooling
Marks or means that cuts
Parchment Surfaces and Smooth
Probably a good Soft cutting
Three step- Wax

Zinc — Stains 50
Tartar Cl. Nap 75
R.T.P. Extra Stellene 175

Melt first two. Raise temp. 260°
add ½ of the Stellene stir briskly
all the time, as soon as melted
add Balance of Stellene and
Stir and when temp is up
to 260° Pour off in Hot moulds
let stand few minutes to set —
then Put Cold water to it to the
blank will leave the moulds —
then Put Bunsen burner flame
inside of the Core and it will
soon leave the blank also —

# 1-19-12
1

Zinc Stirrer 60
Tetra Cl. Naph. 60
R.A.P. Stirrer 175

Melt 1st two and Raise temp. 300° add about ½ of the Lac stir Briskly - when melted add balance of Lac and keep on stirring - when temp is up to 260° Pour off into Hot mould - when Set put into Cold water to harden -

#1-19-17
2

Ent'd P.M.
JAN 19 1912

Zinc - Stearic — 75
Tetra-Cl-Naph — 5-0
R.T.P. Extra Lac — 175
hot made

Ent'd P.M.
JAN 19 1912

Stearin — 5-0
Tetra Cl. Naph. — 75
R & P Extra S. Lac — 175
Temp. 260°
#1-19-12
4

Stearin — 5-0 2½
Tetra-Cl-Naph — 7.5
R.T.P. S.Lac — 200
Sample Temp. 260°
#1-19-12
5
Moulded Blank
Temp. maintained around 240° added
S.Lac gradually

Ent'd P.M.
JAN 19 1912

Stearin 5-0
Tetra Cl. Nap 75
R & P. S. Lac 1 50

# 1-19-12
6

Stearin 5-0
Tetra Cl. Nap 75
R & P. S. Lac 125

#1-19-12
7

Stearin 5 0
Tetra. Cl. Nap 75
R & P S Lac 10.0
Temp. 280° for first two - last 230°
#1-19-12
8

Rec'd P.M.
JAN 19 1912

| | |
|---|---|
| Stearin | 50 |
| Tetra Ch. Naph | 75 |
| R + P S. Lac | 75 |

Temp. 280° for first two
" 220° for last

# 1-19-12
9

This Sample shows an excess of Stearin + Tetra

| | |
|---|---|
| Stearin | 50 |
| Tetra Ch. Naph | 75 |
| Lorenz Gum | 20 |
| R + P S-Lac | 125 |

# 1-19-12
10

Produces a mass of pretty close structure and of fair cutting quality little more yielding than # 1-19-12 the latter is tougher and not so brittle, Both Contain air Bubbles

RECEIVED
JAN 22 1918
Entd P.M

Synthetic Camphor | Part
Syrian asphaltum | "

Produces Soft tarry mass

Stearine | Part
Syrian asphaltum | "

Waxy mass – crystalens

Tetra Cl. Meth. | Part
Syrian Asphaltum | "

Tarry mass – Bubbles
fine Structure

Paraffine | Part
Syrian asphaltum | "

Waxy mass – tarry Structure
~~Does~~ not mix good

Carnauba Wax — 1 Part
Syrian asphaltum — 1 "

Dry - waxy mass - Brittle
closer grain than Plain
Carnauba

Shellac Wax — 1 Part
Syrian asphaltum — 1 "

Fine grain waxy mass
but not enough toughness
Hardness about same as
Regular Edison Master Wax

Japan Wax — 1 Part
Syrian asphaltum — 1 "

finest grain structure of
this series - cools with
a gloss on surface -
But too soft - is sticky when
held between fingers a few
moments - try more asphaltum

RECEIVED
JAN 23 1917
Edtl. P.M.

| | |
|---|---|
| Carnauba wax | 1 Part |
| Japan " | 1 " |
| Tetra Cl. Nap | 1 " |
| Syrian Asphaltum | 3 " |

Too Gummy - Structure coarse
Offers much resistance to cutting
Chips and splits to edge

| | |
|---|---|
| Japan Wax | 1 Part |
| Syrian Asphaltum | 3 " |
| Shellac | 2 " |

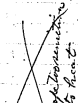
Waxy - but little too gummy
Characteristics of Japan Wax
Cuts glossy shaving which shows
not split to edge - is little
plastic - finger nail will indent
it instead of shaping away
the material

| | |
|---|---|
| Naphthalene (Plain) | 1 Part |
| Stearine " | 1 Part |
| Shellac | 2½ |

Structure too Coarse
Melts to very fluid mass
Does not show Bubbles
Dry enough – not quite
hard enough –

| | |
|---|---|
| Naphthalene | 2 |
| Shellac | 3 |

Grainy Structure much harder
than above Mix. does not show
Bubbles Much tougher than above
Does not cut glossy chip –
No Bubbles




| | |
|---|---|
| Naphthalene | 2 |
| Stearine | 1 |
| Shellac | 4 |

Hard Enough – Tough
Grainy Structure – but pretty fine
does not cut with a gloss – very fluid
No Bubbles
Try Again

Rec'd P.M.
JAN 24 1915

Tetra Cl. Nap. 2
Benzaniline 1
Shellac 3

Little Gummy. Pretty fine Structure
Fracture little glassy - Rosin-like
The heat of the hand melts
remodels it. Gummy - No Bubbles

---

Tetra Cl. Nap 2
P Nitrabic acid 1½
Shellac 3

More Gummy than above mix
But finer Structure. Fracture
is more glassy - the heat
of the hand softens it very
Readily -

---

Tetra Cl Nap 2
Alpha-Naphthol 1
Shellac 4
Very little Rosolic acid
Plastic mass - at ordinary temp.
Color is Red

Rec'd P.M.
JAN 25 1917

Regular E. Master Wax 2
Naphthalene 2
Stheila c 5—
temp 320°. Ed wool + skim off bubbles
Grains & fracture - but
pretty fine - just it cuts
like thorner - and with
the Recording Stylus the
groove has the appearance
of the material crumbling
away at the cutting Edge

Rec'd P.M.
JAN 2 1917

E. Master wax 2 Parts
Naf 2 "
Stheila c 5 "
Same as alone

A closer Examination of this Mixture shows that it has some very good qualities. it is more horny than the Regular E wax and as compact — But when cutting with the Recording Stylus the groove is not glassy: under the glass it shows a white particle intermingled with the mass — which gives the appearance of pigment — Try again

Entd PM
JAN 26 1917

| | |
|---|---|
| Tetra Cl. Naph | 2 |
| Stearine | 1 |
| Gum Thus | 1 |
| Shellac | 5 |

Plenty liquid to filter
Nice looking mass & cuts a thin shaving - Hard & dry -
Only trouble there is shown in the Stylus groove a white particle and that looks like a pigment Crumbles away at the cutting of the Record Stylus

| | |
|---|---|
| Stearine | 1 |
| Naphthalene | 2 |
| Gum Thus | 1/2 |
| Shellac | 4 |

Result - everything desirable Except Hardness - the mass is too plastic y at not sticky nor gummy - it simply becomes plastic with slight elevation of temp. say 80 or 90°

Ent'd P.M.
JAN 26 1912

Tetra Chl Naph 3 Parts
Gum Ethus ½ "
Stellac 4

The Structure of this Sample is too coarse, and Waxy - especially at the edge of the writing Stylus - It is Hard enough

Stearin ½
Naphthalene 3
Stellac 4

Very fluid at Vaporizing point Peeled off ivorine - Sample is very waxy - cuts with resistance But the Structure is coarse - Mealy Raised temperature of the balance and spooled off - that Sample showed much finner Structure more compact - But not enough tenacity and too Plastic - Crumbles under the Stylus -

Stearic 1
Naphthalene 2
Gum Thus 1
Shellac 4

Result. Too Plastic – little gummy at slightly elevated temperature little grandular in Stylus groove –

Tetra – Cl. Nap 2
Resorcinol 1
Shellac 3

Result Similar mass as above – Stylus not groove shows white particles Color like pigment fracture is more refractory than above which indicates closer structure –

Tetra Cl. Nap 2
Phthalic Acid 1½
Shellac 3

Result Similar to next above only rough closer structure, the fracture is very Refractory Rosin-like and cut with a chatter – Brittle yet Gummy Plastic

JAN 26 1917

| | |
|---|---|
| Naphthalene | 2 |
| Stearin | 2 |
| Shellac | 1 |

Structure too Coarse
Mass too soft - Mealy - but dry
Good Sample if Structure was more
Compact

---

| | |
|---|---|
| Naphthalene | 2 |
| Shellac | 3 |

Coarse-grain Structure - Rather Hard
enough & crumbles at cutting Edges -

---

| | |
|---|---|
| Naphthalene | 3 |
| Stearin | 2 |
| Synthetic Camphor | 1/2 |
| Shellac | 6 |

Plastic at slightly elevated temp.
Chips Cuts without much resistance
but crumbles at cutting edges -
Mealy - Structure not close enough
Much Similar to next above - Except
that it is more plastic.

| | |
|---|---|
| Naphthalene (Plain) | 2 |
| Dinitrophenol | 1 |
| Shellac | 2 |

Coarse Structure. long crystals
Not compact. N. G.

| | |
|---|---|
| Naphthalene | 2 |
| Dinitrophenol | 1 |
| Shellac | 3 |

Structure little closer than above mix
Not good mix – seperates on cooling

| | |
|---|---|
| Penta cl. Naphthalene | 2 |
| Dichlorophenol | 1 |
| Shellac | 2 |

finer Structure than above two
Yet crystalys too coarse
Cuts little more waxy –

| | |
|---|---|
| Dinitrophenol | 2 |
| Pentachloronaphthalene | 1 |
| Shellac | 2 |

finer Structure than above three
Harder & more brittle – But
Some portion crystalys seperates
from the rest which is different in
Hardness & Color

Pentachloronaphthalene 2
Dinitrophenol 1
Plain Naphthalene 2
Shellac 4

Soften between the fingers
Structure fairly fine but mealy

---

Dinitrophenol 2
Naphthalene (Plain) 1
Shellac 2
Brittle & mealy - coarse

---

Dinitrophenol 2
Shellac 1
Tetrachloronaphthalene 2
Structure Crumbles - Mealy
two coarse - Not quite hard enough -

---

~~Dichlorophenol~~ 2
Shellac 1
Pentachl. Naphthalene 2
Very Liquid -
Crystalline & mealy Structure
when set Heated some patches
show to have drawn together
the mass is too soft.

Dichlorphenol 2
Shellac 2
Penta-Cl-Naph. 1

Mass looks pretty compact but when scraping with clothing edge the surface shows numerous Structure - some portions harder & of different color - the Sample offers quite some resistance to cutting yet it is little plastic the fingernail will dent it without fracture.

---

Dinitrophenol 2
Shellac 2
Penta-cl- Naph 2

This Sample appears to be the best of this series - yet the Structure is not uniform - some portions are harder. Recorder Styles cuts groove without much resistance but not glossy - may be would reproduce. Rough. Sets quick Enough & dots for the glass without Stick. has some Contraction - try again

Ont'o · Pte
JAN 30 1917

Dichlorbenzene 2
Shellac 2
Pentachlor Naphthalene 1

Dries most well to set evenly some lighter patches appear of different structure –
Structure is of pretty fine grain and Cuts fairly well – Fine grain
Remelted the Sample and blows up better, more Compact – Hard and Cuts with slight without much resistance – is little too brittle
Probably good Sample to mould Cylinder

The addition of more Shellac to the formula on next page → only leads to forming a coarser structure with making more resistant or tougher.

Rec'd Dec. Dept. of Explosives & Board Record on Contract for Shrapnel and Forging &c.

Rec'd JAN 30 1912 A.M. P.M.

| | Parts |
|---|---|
| Dinitrophenol | 150 |
| R & P Shellac (extra) | 110 |
| Penta chlor Naphthalene | 130 |

Melt phenol first, add Shellac gradually — stir all the time — then the naph. when all melted and temperature is 260° filter through 3/16" Soft felt —

Remelt — raise temp to 270° and Pour into heated mould. The mould metal core was about 125° hot, and just as soon as the Dope was set the core twisted off easy and had to use Water to contract the blank from the mould tube.

Rough shaved down to about the proper size, that requires turning off a thickness of 1/8" at that depth the Dope was not compact. So flamed the surface to close the structure & put in oven oven night temperature 120° Stood Smooth, and Still showed air spots.

Penta Chlornaphthalene is the Product that comes over last in the Manufacture of the Tetrachlornaphthalene - it is of higher Melting point and Tougher -

Like addition of Iron Shell to formula → leads to produce

Entd P.M. FEB 1 1912

Penta Cl Nap. 1 Part
Dinitronaphthalene 1 "
Sulfur 4

Makes nice free running Hard mass - Jetoid - but Hasbeens with Some air holes.

Penta Cl Nap 5
Sulfur 5

Very Jetoid - enough to fill to showing 1/8 in Shaft past Jet. Pouring off Samples after cooled and set - Some Sulfur and air holes - Runoff a portion -
Otherwise it is very hard and very compact would be useful for Spinning Tops, Guards, or Spinning Tops
Makes a Smooth S. having Glossy Could be less brittle -

Try Again

Raising temperature for the above as high as 360° does not improve the Product - in fact it does not result agreeable as this Jetoid -

(65)

Note — After 14 days inspected Blanks made by the Dope on Next page → and a white frost or exudation was apparent —

#2-1-19
1

Pentachloronaphthalene 100
Dinitronaphthalene 100
Rt P. Castrol Shellac 170

Ent'd P.M.
FEB 1 1912 Melt first two and Raise temp. 300° add ... Stir all the time and let temp. gradually go up to 320° ... Filter through 3/16" Asbestos into the Coating machine. Coated 4 blanks and placed in the Cold temp. 30° for 3 hours Shaved — Could not obtain a glossy Surface Examined under Glass — the Structure was very Porrous — or it appeared to be as under the glass — it may be that the cutting edge sealed off portion of the Dope instead of cutting through — and the sealing gave the Shave the Spongy appearance

Two days later Examined the Surface of the Shaved Blank and found a white frost — an exudation from the Dope — That Same frost does not show upon small Sample cuttings —

Picric ether Naph - 5
Dinitro-naphthalene 5
Shellac 6

Good Hard Compact Mass which can be filtered in the open through 3/16 felt Too - Hard to cut Records But would probably spin good commercial Records - Shellac may be increased to make tougher & Harder Mass after 10 days looks same as as when made -

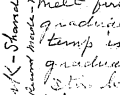
The addition of Synthetic - camphor — Pentachlorethane Nitrotoluol & naphthalene does not improve the above mix.

Made Blank K-Standard with Lemon Drying Oil & Casing and Burnt Umber for coloring. Put in Mould Feb 12 1912

# 2-12-19
1

| | Parts |
|---|---|
| Retral ll. Nap. | 140 |
| Stric acid | 40 |
| Synthetic Camphor | 40 |
| R&P extra Shellac | 280 |
| Sal Soda | 20 |

Melt just thick and add Shellac gradually - when all dissolved & temp is about 250 add Sal.So. gradually - Keep flame on full & Stir briskly all the time - When temp. has reached 320° filter through 3/16" thick soft felt - Run into and pour into Cold mould - as soon as cold the blanks let go both the Core & the Shell -



# 2-12-19
2

| | |
|---|---|
| Stric Acid | 80 |
| Naphthalene | 120 |
| Synthetic Camphor | 20 |
| Shellac | 280 |
| Sal Soda | 30 |

Made up same as #2-12-19
1

Remark - Naphthalene Consumed after 2 months time

# 2-13-19
1

| | |
|---|---|
| Stric acid | 10 |
| R & P Shellac (Extra) | 16 |
| Sal Soda | 5 |

Melt high temperature - as soon as Stock is melted add Shellac gradually and Allow temp to Rise up to 300° then add Sa. Stir Briskly all the time and allow temp to rise up to 460° filter at 440°.

The result is a hard Soap like mass - its fracture is similar yet it is little plastic — the moisture from the fingers dissolves the Surface and sticks not Suitable for Master work But the addition of Master Wax produces a good Mass - it mixes in all proportions to obtain a more or less hard with certain limits - Mixtures begin at above formula 1 Part of Master Wax 1 Part - the result is then little sticky and in warm weather the chips would probably stick - add more M. Wax to overcome -

Rec'd P.M.
FEB 13 1912

# 2-13-19
2

This is the Same formula as #2-12-19 the only difference is in the making — which is that in the remelting the temperature was carried to 350° and was about half hour reaching there then the flame was turned down and allowed temp to reduce to 300° — Skimmed off the froth & Poured into called moulds — Contracted off O.K.

Made 125 cakes

| | |
|---|---|
| Stearic acid | 60 |
| Naphthalene | 90 |
| Synthetic Camphor | 15 |
| R+P extra Shellac | 210 |
| Sal. Soda | 22 |

Rec'd P.M.
FEB 14 1912

| | |
|---|---|
| Stearic acid | 90 |
| R+P extra Shellac | 210 |
| Sal Soda | 30 |

Make quickly - Melt Stearic when temp is 180° add Sal gradually when all dissolved and temperature is 300° add Sh. all at once Stir quickly and allow temp to rise up to 440° - by that time the mixture is clear except few bubbles and specks that are captured on the filter — filter through 3/16" thick Soft felt — into the Coating machine & coat Blanks

# 2-14-19
1

Mixture of #2-14-19 / 1 Part
2

# 2-14-19 / 1 Part
3

Pentaerythritol Naphthalene 1/4 "

Melt together Produces a mass that is very smooth to the touch and Shaves without offering much resistance to the cutting Edge and leaves a fine glossy Surface

RECEIVED
FEB 14 1912
Ent'd P.M.

#2-14-19
2

| | |
|---|---|
| Stearic Acid | 14 Parts |
| Gum Elemi (Fused) | 4 " |
| Aluminum Stearate | 1/2 " |
| Sal Soda | 3 1/4 " |

Saponify by adding the So. Gradually to the fat three - After all melted and temp above 360° Requires quite some time before Saponification is complete Produces a mass nearly as hard as Carnauba Wax and just about the Same cutting quality. The Structure looks finer than the Carnauba Wax.

| | |
|---|---|
| Stearic Acid | 14 |
| Gum Damar | " |
| Stearate Aluminum | 1/2 |
| Sal. Soda | 3 1/4 |

Saponify Same as above, And the Result is Very much the Same

#2-14-19
3

Cannaba Wax 2
Stearic Acid 1/2

Increases the Contracting quality of Plain Cannaba

Cannaba Wax 2
Gum Elemi (fused) 1/2

Decreases the Contracting quality of Plain Cannaba and lightens the Structure.

Cannaba 2
Penta. Cl. Naphthalene 1/4

Changes Dark Yellow Cannaba Wax to light gray & produces a closer grain Structure and little tougher & smoother

Cannaba Wax 2
Penta Cl. Naphthalene 1/2

Same effect as above But in a greater degree - Both Show a graining Structure as if one portion crystallized sooner than the other.

Edison Master Wax 2
Japan Wax (Soft) 1/4

Rec'd P.M.
FEB 14 1916

Produces a mass that appears of good Recording quality — Very fine grained. The Structure is dense — That is shown by the mass having translucent — more glossy & offers little more resistance to the cutting. Stylus -

Edison Master Wax 2
Gum Elemi (fused) 1/2

Produces a mass little harder & tougher & closer structure than Plain Edison Wax - the Effect is about the Same as the introduction of Japan wax except that the result is a more brittle instead of a more plastic as in case of the Japan.

RECEIVED
FEB 15 1917
Ent'd P.M.
FEB 15 1917

| | |
|---|---|
| Vaseline Nafa | 140 |
| Stearic acid | 40 |
| Synthetic Camph | 40 |
| Shellac | 280 |
| Bic. Soda | 20 |

The above formula produced a Good mass - Mr Edelman said it was little too hard - Tryed to make softer by addition of Synthetic Camphor - Soon very part added the Result is a softer mass But the Structure alters to a coarse good mushy mass -
Then try by reducing the amount of Shellac - this works better but as the amount of Shellac is reduced the Synthetic Camph. amount is reduced also
The following is what looks to be a pretty good compound

| | |
|---|---|
| Vaseline | 140 |
| Stearic | 40 |
| Synthetic Camph. | 30 |
| Shellac | 200 |
| Soda | 20 |

| | |
|---|---|
| Ketone el. Naph. | 140 |
| Stearic acid | .40 |
| Synthetic Camphor | 30 |
| Shell | 200 |
| Sal-Sodae | 20 |

Saponify at Temperature between 210 & 220°. all the Bubbles do not disappear at that temp. Even at the end of 3 hours, thru out temp Rise up to 370°. The mass becomes much more liquid and the evolution of Vapour is very prominent — There is still be thin layer of froth that seems to precipitate - Filter - right into mould. (cold)

# 2-17-19
1

| | |
|---|---|
| Tetra Ch. Naphthalene | 140 |
| Stearic Acid | 40 |
| Synthetic Camphor | 30 |
| R. & P. extra Shellac | 200 |
| Sal - Soda | 20 |

Melt the first three together - then add the Shellac gradually when all melted and temperature is 240 - start to add Sal. Soda - gradually stirring briskly all the time - Requires 2 hours to make - there is considerable frothing that dont melt away and likes to remain on the filter - Raise temperature very slowly up to 300° + filter.

Remelt and heat cooling quickly so as not to form bubbles - Temp 320°

Pour into cold Molds —

# 2-20-19
/

Very difficult to eliminate the last traces of gas bubbles

Boiled Montana Wax in about 5 parts of water for 1½ hours and set to cool - found that the water was remaining would not seperate out of the wax as it cooled It looks as if a Solution —

| | |
|---|---|
| Cotton Cl. Nap. | 140 |
| Stearic | 90 |
| Synthetic Camphor | 25 |
| Soda Soda | 20 |
| R+P Peptic Shellac | 200 |

Melt the first three to temperature 330° now lower temp of the lignine to 250° add Soda gradually in 35 minutes saponification is complete - add Shellac very gradually keep temp 280° all the time in about half hour all has been added stirring briskly all the time. let temp rise to 320° + filter through 2 thicknesses of Record Cotton wadding Right into cold mould

# 2-22-12
/

| | |
|---|---|
| Natrol Cb. Naphthalene | 560 |
| Stearic acid | 400 |
| Synthetic Camphor | 80 |
| Sal-Soda (wet) | 104 |

Saponify slowly allow temperature 210-220° after all soda has been taken up let temp slowly rise to 310° — by this time (which this batch shows to be 1.45 hr.) the liquid is very much free from bubbles or gas and a serum which looks to be oily floats near the edges of the pan — allow temp. to drop to 290° & filter through Extra fineness of Record crepe Cotton on 3/16" soft felt

Will Stamper # 2-26-12

Remark - Some air holes on one side of the blank after showed [illegible] -
Probable cause - Dope had not cleared enough before pouring -

Structure very fair

Structure very fair - Some cracked - probably string air holes

# 2-26-12 —— 100
Entd PM R+P. Sp. Shellac 260-280 100
FEB. 26 1912
Temp. 310° + filter through 2 thicknesses Record wrapper Cotton
Blank 6 hours. air holes on one side
Blank 6 Allowed the side which the pouring was done — immediately after pouring — dipped into Ice water to chill — probably was made + filtered too quickly the cause of Bubbles
# 2-26-12
1

# 2-26-12 —— 120
R + P. Sp. Shellac 120
Melt slowly at 220 to 230 when Shellac is all taken up let temp slowly Rise to 280° + filter — was too Viscous to go through two thicknesses of Record wrapper Cotton Paper through a Funnel. balanced through one Chiffonier Chilled in Ice Water
Will Number # 2-26-12
2

See March 1st Blank 6 Allowed

Structure very fair - probably due to tiny hair-holes is the reason of the crackling noises -

#2-26-12 — 140
R.+P. Ext. Shellac — 120

Rec'd P.M.
FEB 26 1912

Melt Slowly - add The Chalk at temps. 240-260 when all taken up Raise temp to 290° & filter through 2 thicknesses of Record Wrapping Cotton - pressed through cloth small amount apparently passed through ; another - Had moved about 150° Ext. as soon as poured Chilled into Ice Water Extracts O.K.

Mill Number #2-26-12
3

Structure not so compact as # 2-26-12/1 + 2-26-12/2 and # 2-26-12/3 is due to excess of solvent material

Structure a shade better than # 2-27-12/1 but not as good as the #'s. 2-26-12 #1-2 #3

But surface more uniform - does not crackle so much

Rec'd from Chas. Lennox Kerr Nov. 27, 1911

Rec'd from Chas. Lennox Kerr Nov. 27, 1911

Rec'd from Chas. Lennox Kerr Nov. 27, 1911

Structure coarser than
# 2-27-12 which indicates
2
that there is not enough shellac
in proportion to Rubrene matrix

Surface unsmooth

Butt'd P.M.
FEB 27 1912

| | |
|---|---|
| # 2-26-12 | 100 |
| Pontac Ch. Naphthalene | 40 |
| Shellac A.I.P. 4x | 100 |

Melt Slowly - add Shellac at
240-250° — when all taken up
allow temp. to rise slowly to 310° +
filter through 3/16" soft felt and chill
in ice water. This blank did let
go the mould little easier than
the 4 previous experiments

Will Summer # 2-27-12
3

NOV 12 1912

made Six Blanks with formula 2-26-12 with the only difference that I have run the temperature up to 300° just before pitching — that was to enable me to have on a 3/16" thick soft felt — which worked all right — it is a little slow going through — 2 of the Six Boards extracted from the moulds Cracked — remelted them and filtered again into the mould through one thickness of Record wrapper — cotton — just enough to prevent bubbles coming through — both of them seems to be more ductible in water — will mark these two with the additional letter R.

Surfaces on all of the Six blanks showed to be very compact — with the exception of 3 blanks which did not chill uniformly the moulds must be uniformly Hot. about 270° or 260° — just enough so that the Dope will not boil and so it will not cool enough to set — because if it begins to set at normal temperature the structure of the Dope is coarse

Rec'd
MAR 2 1912
P.M.

Lactic Ac. Nap- 7½-
Stear 2½-
Syr. Comp- 1½-
Sod Su- 6½
Shellac- 12½-

Melt first three - Saponify - then add Shellac - gradually - when all taken up let temperature rise slowly to 310° - Skim off froth - filter through 3/16" Soft felt into Hot Moulds - then chill into ice water

# 3-2-12
1

Mould 2 Blocks X Bottomed to Mr Hodkinson

8 mi. Blank

| | |
|---|---|
| Tetra Cl. Mfg - | 300 |
| Stearic | 112 |
| Synthetic Camp. | 60 |
| Sal. Soda | 18 |

Saponify slowly then add

R+P Gum Shellac 500

The above weight was not quite enough to fill the mould —

was filtered twice — 1st through a 3/16" soft felt and heated again to 300° and filtered again through fine linen right into moulds chilled in ice water - required about 3/4 hour - extracted with considerable force - next morning was cracked —

Form Blank

| | |
|---|---|
| Tetra Cl. Nap- | 360 |
| Steam | 134 |
| Synthetic Camphor | 72 |
| Sal. So | 34 |

Saponified 120° Diluted & added
K[illegible] Shellac — 600
filtered through 9/6" felt and
over layer of lime fuller — this
filter is too thick 1309 grs. would
not pass through on account
of congelation // Consequently
the Blank turned out
only 6 inches long.

Will Number 3-5-12
/

Proc Blank

| | | |
|---|---|---|
| #2-26-12 | — | 700 |
| Shellac | — | 700 |

Melt the first - Raise temp. 300° Keep there until all gassing is eliminated - add Shellac gradually - when all taken up - skim off the dirt - Raise temp. 310° filter through fine Linen into another container - then Pour into mould. Heated about 150° - through Vaseline to retain any possible bubbles -

# 3-6-12 / 1 the Blank is not numbered at present

Made Small Cylender of the Same dope as on next page → there was only enough dope to mould about a half a blank

Mill Number # 3/19/12
1

MAR 29 1912

8 mi Blank

Made Cylender with Dope as follows

| | |
|---|---|
| Stearic Acid | 840 |
| Stearate of Soda | 60 |
| Stearate of Zinc | 15 |
| Per Oxide of Hydrogen | 25 |

Melt all ingredients together when all fluid and temperature is 210° add the Per Oxide Hydro- and stir briskly – boiling & frothing takes place which gradually slows down in about 3 hrs. the temp- rises to 275° Jitter through double material one a layer of 3/16" soft felt & one layer of Handkerchief linnen goes through Like water. Pour into hot mould and chill in Ice water. when set the outside mould shell pulls out loosely & the inside with a light tap. after the blank was extracted it cracked open- found that the inside of the blank was warm & the outside cold which caused the cracking – no doubt- Melt & Removed # 3-19-12-#1

3-23-12 – Stearic, Soda, Zinc, Per Oxide & Linseed Oil Rubber – Two Coats

One Small Size Blank
Same Dodge as opposite →

# 3-20-12
1

8 mi Blank

Made cylinder with dope as follows —

| | |
|---|---|
| Stearic Acid | 1000 |
| Stearate Soda | 60 |
| Water | 1000 c.c. |

Melt the first two - when fluid and Temperature is about 200 add the water gradually stirring all the time - the temp must not rise above 220 for 2 hours then slowly up to 280° in 1½ hrs more the froth & Bubbles have all disappeared by this time - Filter through 3/16" Soft felt & skim together - then refilter again - then pour into hot moulds - let stand for about ½ hr & chill in Cold water for 10 minutes let stand in the open for a short time and chill again in cold water

Crackedon Cooling - Remelt & mouldagain

# 3-20-12
1

3-21-12
Returned One 13 Blank to Mr Newman Too Soft

8 mi Blanks

| | |
|---|---|
| Stearic Acid | 1000 |
| Sodium Stearate | 20 |
| Water | 8 ccs. |

When all melted and temperature is about 200° add the Water gradually - Stirring all the time until all the bubbling is over then put on Asbestos Table for 24 hrs. temperature of Bath 230° - filter twice through 3/16" soft felt & Handkerchief linen and pour into cold moulds But the taper cores must be warm. about 150° - Chill in cold water not ice cold - Chill Number # 3-21-12

1

3-25-12

Delivered one Blank to Mc Hain

Report - Too Soft

Remarks —
The result of experiment on next page is bad. The blank turns out unevenly crystalized the structure is coarse instead of compact. Making a small sample of the same formula turns out very good — a careful observation has shown me that the heat required to complete the Dope will permeate through a small portion and within a reasonable time. But a large portion requires more heat and much longer time — that difference has the effect of condensing the Shellac enough that it remains rubbery upon cooling and does not set at the same time as the other ingredients which is the reason of the Coarse Structure and gummy-like mass —

Small Blank

| | |
|---|---|
| Jutra Cl. Naf. | 350 |
| Stearic Acid | 175 |
| Synthetic Camphor | 75 |
| Sal. Soda (wat) | 40 |
| Shellac | 500 |

Saponify the first three — temperature up to 300° to clear off all bubbles requires about 1 hr. — Add shellac gradually Stir all the time. When temperature reaches 300° filter through 3/16" Soft felt and Handkerchief simmer into another Vessel then Pour into mould outside cold and inside tube about 125° warm — let stand about 10 minutes then place mould in water (city water) when the blank has set up to the inside tube take out of the water — Tried to force out inside tube was still too warm Run water in the tube to cool it then the inside tube contracted — the outside slipped off easy —

Since the date previous to this have made numerous experiments of small samples only - some of which looks pretty good and two cylinders are made of them. will enter their compositions in book

Rail Tetra Cl. Nap. with Ed. Caustic Soda that has been subjected to deliquescence by exposure Temp. of limbed was 330° and the bubbling had subsided - filter through Handkerchief limpid into cold water

Entd
APR 24 1918

Since the date previous have
had some experimenting with resin
combinations — No colors have
made what I consider a discovery
in the working of shellac — that is
to melt the shellac with chlor-anilene
in sufficient quantity to render it
fluid that it will filter through
3/16" soft felt and finest Handkerchief linnen
and then after-ward evaporate the
Chlor-anilene until the shellac
assumes a crisp consistency again.
Have tried shellac 2 parts with
Ortho-chlor-anilene 3 parts and
shellac 2 parts with Para-ch.-anilene
3 parts the latter shows no noticeable
difference to the former so far as
the consistency of the shellac after
evaporation of the Cl-anilene —
Both mixes good with Tetra-cl. Nap.
which renders the shellac softer — upon
close examination found that the Tetrach.
Nap only mixes with the so treated shellac
and alters the structure of the shellac
to produce a coarser grain —
the resulting dope has not so much —

Ent'd
APR 24 1912

affinity for high temperature as it has with Shellac not treated as aforesaid - the Dope has not quite so much tenacity

#4-24-12-#2

Make larger quantity

Para-chlor-aniline 5.5.0
Shellac " 2.1.0

Melt & filter through 3/16" soft felt and finest handkerchief linen into flask bottle and then place over heat to evaporate the Para-chlor-aniline

Para-chlor-aniline melts at 160°F. would not evaporate from flask bottle quick enough so turned into Casserole when bubbles began to appear turned the mass into tin to Cool - was plastic the next day - then placed the tin in over the steam Heater - temperature there was 155° after two days lifted the tin and the stuff was plastic enough to run slowly after 10 days the stuff was Hard -

Ent'd
APR 25 1912

Extracting the Wax from Shellac -

Dissolve 10 gm. Shellac in 15 cc. of Diethylaniline - Raise temperature to 300° & filter through fine linen Remelt without stirring - the Diethylaniline will come to the top pour it off and evaporate - the wax will remain -

This method was found by attempting to liquify the Shellac enough to filter very fine then Evaporate the Solvent to obtain the shellac free from dirt & grit - But the resulting Shellac is so condensed after Evaporation that it is difficult to remelt - But the quality of Shellac seems to be tougher Than before the treatment -

Steinmetz #4-24-12-#2

Fadelo Carnaba wax 1 Part
Stearic acid 1 "

Melt together Raise temp to 330° and filter

Rec'd P.M. APR 26 1912

Canada Wax

Melt with some Cresotinic acid to reduce the brittleness of the wax

Rec'd P.M. MAY 6 1912

Continued

# Filtering Shellac

Arctic Ether 500 c.c.
Shellac 100 gms.

Heat to 130°F. Stir briskly all the time

Filter through fine linnen into Distilled water at normal temperature — the Shellac precipitates in a spongy like form — the Ether enters into the water from which it may be evaporated at 150°F.

The filtered Shellac is then placed on sheets of absorbent papers to dry for about 2 days — when it is like hard dry powder —

Put one Shellac, when a little down temp 125° on Jan 11th at 10:15 am. Took out this one is then not stirring [illegible] dry, and smells [illegible]

Rec'd P.M. 1912

#5-7-12 #1

Arctic Ether 750 c.c.
Shellac 150

Temperature 125°. Stirred all the time in about 20 mi. Filter through 3/16" soft felt + linnen into filtered water at normal temps. — does not crumble as well as should — forms sponge like masses. would prefer a powdery form.

Took the water + arctic Ether liquor to Dr. Gudeman to distill off the Ether.

Rec'd P.M. MAY 8 1912

Arctic Ether 30 c.c.
Shellac 3 gms.

Boil at 170° for 45 mi. and arctic Ether 10 c.c. more to make more liquid for filtering. after 15 mi more.

Have water same temperature as Shell. sol. 170°

The water was 140° — works much better than water at normal temps. Kept time have water same temps. as Sol.

Ont'o P.M.
MAY 8 1912

# 5-8-12-#1

Syn. Camph. 10
Acetic Ether Sol. Filtered Shellac 5
was too liquid added Shellac 1½ more
there is no bubbling - Temp. 256°
Was on Steamtable over night, the
mixture is still soft Rubbery - added
Para Cl.-aniline ——— 1-1

# 5-8-12-#2

Oil of Canada Balsam
Boiled in Acetic Ether and
let condensed to the point
of thick bubbles -

# 5-9-12-#2

The Sample upon glass before
adding more Ortho-Cl.-aniline showed to
be very hard & brittle & free from Bubbles

Ont'o P.M.
MAY 9 1912

# 5-9-12-#1

Para-Cl.-aniline 5
Shellac — 5
in Casserole on Steam Table.
Next morning let cool - result
a hard clear brittle mass with
some Bubbles - Soften by Fusion
the fingers to gummy mass

# 5-9-12-#2

Ortho-Cl.-aniline 10 c.c.
Shellac (Conc.) 10 grms.
Temp. of Solution at 200° it begins
to evaporate added shellac - gradually
Temperature about 280° until now the mass was
condensed as that it was difficult to obtain added 15 cc more
of ortho Cl. aniline to liquify at 4:45 Raised temp. to 410° the
Boiling Point at 4:30. Raised to 466° - 5:30 Poured off, was thick

# 5-9-12-#3

Ortho-Cl.-aniline 10 cc
Quinine Sulph. 5
Shellac — 10
add little shellac as some on fingers 2:00
at 12:20. temp. 250°
— Bubbles much — N.B. —

End'd P.M.
MAY 9 1912

#5-9-12-#4

Para'd anilene 10 gram.
Stellac (Filtered) 10 gram.

at 4.00 temperature was 242°, Keeped condensing Cover on carseal all the time at 4.30 has down to 232° at 5.05 temp. 370° 1st Pouring #5-9-12-#4 at 5.30 was plenty liquid at 3.25° few very small bubbles - Put in oven at temp 125° - 2nd pouring at 5.50 P.M. put in oven at 125° temp. - Next morning the mass was some plastic - yet Brittle - glass-like structure having some fine bubbles on the surface - more on the second sample then on the first - the second sample is harder & more brittle - Remelted the scrapings around the Carseal and added some Ether - Cl. Naf and stearic acid and heat moderately. The proportion of Ether was a little more then the Stearic - (not weighted) but enough to make the result wax-like cut. after a little time the bubbles all go off and the result is a clear liquid enough to pour - will mention sample 5-9-12- #4 A

End'd P.M.
MAY 9 1912

#5-9-12-#5

Para'd anilene 10 gram.
auric Ether filtered Shellac made the gel 10 "

Bring to boiling at 87°C temp. for 20 min. there was frothing and sputtering at first which cleared off - put on steam table over night - Next morning the temperature was 210°C showed no sign of Bubbles, and was about as thick as gum - put a sample upon glass - will No 1 at 8 morning - put Glass upon tin cover on Steam table (5-10th at 4-30 P.M. take out to cool - the glass dough Inspection on the 13th shows the Dope to be brittle where applied thin and plastic - where thick.

on the 13th at 9.00 a.m. the Dope in Carseal has been on steam table night and day since first melted - took a small button on glass and it hardened quickly - But contain some bubbles - Poured off about ½ the quantity upon glass and added 5 c.c. of acetone to the balance and put on steam table at 9.40 a.m. at 10.05 the acetone is reduced to Bubbling more then before the addition - add Syn. Camphor. ¼ part at 11.05 contained Bubbles plentifully I.N.G.

Ent'd P.M. MAY 10 1912

# 5-10-12 #1

Stearic acid 10
Tetra Cl. Naph. 15
bring to 500° temp. and filter through 4 thicknesses of Recorded unafter Cotton at fairest Minimum subcentemps. has dropped to 300°. The result is simply a mixture which crystalizes much similar to Plain Tetra

Ent'd P.M. MAY 10 1912

# 5-10-12 #2

Stearic acid 10
Tetra Cl. Naph. 15
Para Cl. analine 5
Raise temp to 500° — then lower to about 340° & filter same as above. Dossin't flow

Ent'd P.M. MAY 10 1912

# 5-10-12-#3

#5-10-12-#1 ——— 7½ Parts
#5-9-12-#4 ——— 7½ "
was too Gummy. add more
was again too gluey — Have no more #5-9-12-4 So had #5-9-12 #1

2:30 Temp 258° Absolutely no Bubbles —
at 4:10 have taken 4 samples about 1 hr. apart — now it just begins to bubble if stirred — Pour off

Ent'd P.M. MAY 10 1912

# 5-10-12-#4

#5-10-12-#2 ——— 1 Part
#5-7-12-#1 ——— 2 "
Condenced at 260° in 20 min.
add #5-10-12-#2 more — ½
Condenced hard in 10 min more M.A.

Ent'd P.M. MAY 10 1912

# 5-10-12-#5

Para Cl. aniline 5
#5-7-12-#1 10
at 3:15 temp was up to 4:30°
lower the temp. to 3:30°
at 340 tested was brittle but free of Gritts. add Stearic acid — ½
at 4:50 was Condenced to plastic Mass

#5-10-12-#3

Inspection on the 13th shows the Sample to be plastic — but of a waxy consistency and a grainy structure

#5-10-12-#2

Para Cl. Anilene 7/8
#5-7-12-#1 10
at 4:30 Temp. gradually raised to 374° and nice froths
at 4:45 now 400°. Lower it - take first sample on glass - leave in open air at 4.50 - temp 360 no more frothing - at 5:15 temp. 380° take Sample #2 was frothing much - Add Tetra Cl. Methylene and lower temp. to 380°
at 5.30 Temp. 345° take sample #3
at 6 Temp. 340° Add Tetra Cl. Methylene
at 6:30 Temp. 340° Add more Tetra Cl. Methylene
at 7 Temp. 340° Add more Tetra Cl. Methylene
at 7:30 Temp. 340° take Sample #4. Froth is now clear
Turn off the Heat for evening
Kept burning at 5.10 shut on Heat Raise temp. to 340° There is no sign of Rubber - take Sample #5
at 9.30 was Condensed stiff

#5-11-12-#2
Inspection on the 13th shows a Gummy - plastic mass -

#5-11-12-#1

Acetone 40 cc.
#5-7-12-#1 10 grms.
Put on Steam table in Large Casserole with condensing cover
at 9.45 acetone had evaporated off and the result was a rubbery mass - Add acetone 10 parts amber oil 1/2 part in few minutes was again evaporated the result was a more Elastic mass & full of stiff Rubber - Add fused Gum Final 1 part at 10.05 was more plastic but stiff add Para Cl. anilene 1 part 4/more at 10.30 - was Condensed stiff - The Skillet showed to have separated some -

#5-11-12-#2
Para Cl. Anilene 5"
Dimethoxyphthalate 1/2
#5-7-12-#1 5"
at 10.45 while at other work the stiff Boiled over the Casserole - noticed it soon after and lowered temp. the boiling over was at a temp above 350°. at 11.15 was thick and Rubbery add Para Cl anilene more 1/2 part at 11.20 Poured off with Rubber - add some Para Cl. anilene to liquify what is left in casserole & Evaporated on paper & Poured some upon glass & put in oven 130°.

Rec'd P.M.

MAY 11 1912

#5-11-12-#3

Paraffine oil 5
#4-25-12-#2 ½
#5-7-12-#1 5

Melt the first and try on glass - when cold it is so hard that the finger nail will not scratch it - Add the second and try on glass - then the finger nail will scratch it and is Hard-waxy-like - add the 3rd quantity and keep temp around 300° Try on glass as soon as all melted and clear - the result is a plastic mass - but clear - at 12.15 try another Sample on glass at 12.20 Temp. 275° looks as if Bubbles was beginning to form Pour off.

Inspection on the 13th Shows a mass which may be described as a plastic - Brittle consistancy - the fractures shows that the Cannabis may well simply mix throughout to destroy the Tenacity of Plain Shellacs - the Sample also Brittle - yet it is plastic enough to sink the finger nail into - T. G.

Rec'd P.M.

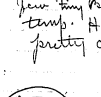
MAY 13 1912

#5-13-12-#1

Oxto-cl. aniline 50 cc.
Plain Shellac 10

Trouble. When temperature has reached 390° Dip papers and allow to dry in open air until #5-13-12-#1A

Begins to boil at 11.45 at 11.53 Raise temp to 410° Gas on full - only admitted just between — Filter through paper - Some wounded not go through at the end - Put back over flame at 1.20 P.M. Raise temp. to 410° allow Vapours to escape. no Cover - Pans off at 2.05 - had few tiny Bubbles - Result Lotion at low temp. Hard - Brittle - Little tacky - pretty close to Plain Shellac



Rec'd P.M.

MAY 13 1912

#5-13-12-#2

Xylidine 10
Plain Shellac 2½

Trouble. Begins to boil at 392° Dip papers into and allow to dry in open air until #5-13-12-#2A

Boil at 408° until 1.30 + filter through Photo filter paper Condensing temp about 300° No Bubbles until it becomes quite thick

Ent'd P.M.
MAY 13 1912

#5-13-12-#3
Diphenylamine
Plain Shellac
Shellac develops either Temperature is 300° Boils at 310°
-at 380° begins to froth & thicken
Poured off — kept morning was left Rubbery ff. M. S

Ent'd P.M.
MAY 14 1912

#5-14-12-#1
Anidine acetate
dominant melt at low temp.
add little Xylene
Plain Shell —

Ent'd P.M.
MAY 14 1912

#5-14-12-#2
Methylaniline 10 cc
Plain Shellac 10 gm.
at 9:30 Poured off # free of Liquidity
gravity which was as thick as could possibly be used and contained Bubbles — add 4 gm. of Xylidine to the balance and reheat — the Bubbling is eliminated by the addition of Xylidine at 10.15 Temp was 360° Thickens up and becomes a mass of Bubbles. add Xylidine 5 mm to liquify at 12.00 Poured off was Condensed stiff.

Ent'd P.M.
MAY 14 1912

#5-14-12-#3
#5-8-12-#2 ——— 5 gm.
Xylidine 5 cc.
at 10:30 - Temp. was 350° and a sample on glass is how condensed a considerable — at 11:00 Poured off a Sample on glass #5-14-12-#3A - Hard Brittle and after adding about ½ of #5-14-12-#2 — when liquid from the caramel Pour off a Sample on glass #5-14-12-#3B Runny-Brittle
Poured off at 11:10 #5-14-12-#3C Runny-Brittle

#5-14-12-#4

Aniline Blue Oil 10 cc
Plain Shellac 5 gms

Ent'd P.M.
MAY 14 1912

Boils at 260° filter through 4 thickness of Record wrapper Cotton + 1 of lime trimm. put on to boil again with Condenser Contact at 1.10 Temp 270° Begins to thicken at 1.45°. had thickened enough to form Bubbles. temp 300° at 2.05 Poured off on glass - Contained Bubbles. Sets very readily to hard Brittle Mass

#5-14-12-#5

Aniline Red Oil 10 cc.
Plain Shellac 5

Ent'd P.M.
MAY 14 1912

Boiling to boil - at 1.40 Filter through 4 thickness Record wrapper Cotton Put on flame again to boil at 2.20 - the temp was 260° - at 2.30 temp 330°. Poured off at 4.30 P.M. - had condenced and add more aniline but had not clear - try again -

The Aniline Blue Oil reduces with the Same quantity of Shellac quicker then the Aniline Red Oil

#5-14-12-#6

Xylidine ... 5 c.c.
Ether Sulfonic Shellac 8½ gms.

Ent'd P.M.
MAY 14 1912

Temp up to 340° then down to 300°. at 3.15 P.M. Pour off a portion - add in equal parts bubbles remaining from upper portion Tuntz CL. Naph. to the balance, about 1½ to ½ — well #c 5-14-12-#6A Poured off at 3.50 P.M. there was no sign of Bubbles, It set almost instantly to a tough mass - little plastic - Breaks readily the fracture shows a coarse grain — Just a good mixture

#5-14-12-#7

Steam anisol 1
Tuntz CL. Naph. 1½
#5-14-12-#6 4
Temp up to 270°

Ent'd P.M.
MAY 14 1912

#5-14-12-#8

Cannada Balsam 20 gms.
Xylidine 15 c.c.

Ent'd P.M.
MAY 14 1912

Melt Balsam temp 340° when all Bubbles are 260° gradual add xylene. Burton Steam Table 100° Night On the 15th at 2.50 Pour off - was perfectly clear - Polymerized Sets Hard on cooling.

Ent'd P.M.
MAY 15 1912

#5-15-12-#1

attempt to find a solvent to condense shellac so the product may be in liquid state to pour into moulds and set dry-tough & Hard-

Paraldehyde

Plain Shellac

Dont to molten temp. Boiling 240°

Add few drops of Amline Red oil -

at 248° Much of the aldehyde has evaporated combination takes bottle but not what makes simply an addition product - soft - sticky

Ent'd P.M.
MAY 15 1912

#5-15-12-#2

Acrolein

Plain Shell -

Dissolves good at 260°

at 11.45 Temp. 310° - down to 280°

at 1.25 - was thick enough to begin to Bubble if stirred Pour off

Sample upon glass does not set Hard as soon as cold - is little gummy & sticky

Ent'd P.M.
MAY 15 1912

#5-15-12-#3

Xylene

Para Rubber

Melt Raise temp to 320°

Makes clear Solution - No Bubbles

add some #5-14-12-#8 - this does not Combine - simply mixes to form a pasty - semi-hard coarse grain mass -

Ent'd P.M.
MAY 15 1912

#5-15-12-#4

Anisaldehyde

Plain Shellac

Dissolves good

Temp. 250° to 300°

Keep on adding shellac until a sample upon glass sets Hard as soon as cold - there is plenty of Bubbling - Keep on stirring until Bubbles eliminate very concise - shellac - temp 290°

Pour off at 5-00 - Bubbles -

The importance attached to this Exp. is that the resulting mass is very much the same as plain shellac - little tougher.

Ent'd P.M. MAY 15 1912

#5-15-12-#5

Nitrocylol
Plain Shellac
Dissolves good
Temp. 300° & 240°

Kept on adding shellac a little at a time from 4 pcs. sets hard on cooling — that is plenty of Bubbling the experiment ahead of this sets hard when it is more liquid than this — Pour off at 5:45 the result is much like Plain shellac without showing bottom gained anything because the Bubbling is there Just the Same.

Ent'd P.M. MAY 16 1912

Stearic acid
#5-14-12-#4
#5-15-12-#4 Melt test was gummy
add a little Hexa Cl. Naph. Bleach Residue
Add #5-15-12 #5 — Congeal better

Ent'd P.M. MAY 16 1912

#5-16-12-#1

Stearic acid . 50 — 2 1/2
Tetra Cl. Naph. 75 — 3 3/4
#5-15-12-#4 100 — 5
Temp. not above 240° 4 1

Some Bubbling was noticeable
Poured off at 12:00 — would not
set Hard & Brittle enough — was Hard
— Plastic — after cooling 4 set. The surface
shows a practical appearance, not enough shell
Remelt and add 1/2 more of shell.

#5-16-12-#2

Ortho nitranisol
Shellac
Dissolves good —
Result — Rubbery when when
liquid enough to Pour —
when sets hard on cooling the
moisture Bubbles — Remains soft
& Rubbery after 1 day & after 3 months

#5-16-12-#3

Paraldehyde
Shellac
Dont dissolve with ease

Ent'd P.M.
MAY 27 1912

# 5-17-12-#1

Reaction
Plain Shellac

Raise temp to Boiling and dissolves when liquid on cooling sets Rubbery - when further Evaporated and still liquid enough to pour sets Hard on cooling - Pour with some bubbles

#

5-17-12-#2

Trichlor ethylene
Plain Shellac

Bring to Boiling - Shellac mixes & Bubbles much Don't Dissolve
Pour off - Spongy - when cold is Brittle like - crumbles between fingers -

#5-17-12-#3

Metaldehyde
Plain Shellac

Ent'd P.M.
MAY 27 1912

Bring to Boil 5.50 Dissolves good taken off considerable Shellac when liquid Test on glass when cold is Rubbery - put glass on steam table to Evaporate will #5-17-12-#3A - at 11.10 temp 260°

Stearic acid sprinkled thick on cooling Sorry Shellac

when quite thick does not set Hard on cooling - Rubbery & tough
add little Stearic acid & little Extra Methyl Alcohol - at 10.45 Pour off Bubbles

#5-17-12-#4

Methy-Ethyl-Keton
Plain Shellac

Ent'd P.M.
MAY 27 1912

Begins to dissolve at boiling temp 160°
Evaporates very quickly - Bubbles much
add Stearic Acid - Temp up to 300°
Samples on glass when Cold shows a grainy semi-plastic mass - add little Shellac - Evap - Pour off at 1.20 - Murky mass

#5-17-12-#5

Paraphenetidin
Plain Shellac

Ent'd P.M.
MAY 27 1912

Mixes good when taken
Samples upon glass from time to time at 3.15 - the last sample on glass set hard quickly add Stearic Acid about 20% Was quite free from Bubbles until Stearic acid was added - was thick stringy will Jar them - at 3.45 a sample upon glass shows a grainy structure
at 4.10 took sample on glass shows very few Bubbles at 5.40 - temp 260° left to cool for the night
On the 15th at 11.30 was full of Bubbles and thick elastic - Pour off - two Jar jones

Ont'o P.M. MAY 17 1912

# 5-17-12 - #6

Formaldehyde
Stearic acid

Boil at 270 77-90° for 2 hrs. when no more sign of formaldehyde evaporation add Plain Shellac

1.45 Shellac melts freely but does not spread into the Stearic acid so well as to form a Varnish add more stearic acid and Stir briskly - temp between 260 to 270° after ½ hr. combination takes place - is shown by the frothing - a sample upon glass sets quickly and looks like good showing quality - Best frothing is not eliminated - Further heating shows samples upon glass when cold and set to be more transparent over again there must be more thorough combination

3.30 Temp. 278° Sample upon glass before adding so much Shellac crystalized to a more wax-like material at 3.10 Pour off was full of froth. - look like too far heated

Formaldehyde at 210° will not dissolve Shellac

Ont'o P.M. MAY 17 1912

# 5-17-12-#7

Xylidine 100 cc.
Stearic Shellac 30 gms.

100 cc. of Xylidine equals weight 92 gms.

Put on Steam table in oven at 4:30 left there over night Temp. 210° - next morning on flame temp. 250° for ½ hrs. let cool over Sunday, Monday on flame 250° all day - let cool over night Tuesday on flame 250° - is now very thick and bottom Bubbles all through yet does not set hard enough to be brittle

Ont'o P.M. MAY 17 1912

# 5-17-12 - #8

Formaldehyde about 3 parts
Shellac " 1 "

Begins to boil at 200° at 4.05 - set out to cool Pour off the liquid that come to top - and lay the thick stuff upon glass - there was a little of the shellac that did not drop to the bottom like the greater portion

After Cooling remains Elastic - Soft Solvs after 12 hrs. 48 hrs.

Ent'd P.M. MAY 17 1912

Aniline Red oil.
Antimony Tetrate
Formaldehyde

Ent'd P.M. MAY 18 1912

Stearic acid 1 gm.
Camphor 3 gm.
Hydrochloric acid 3 cc.
Add the H. acid when temp is 200° then
cover & raise to 2:30°
at 11.40 test on glass. show a purpose
like mass. but more crystalene - add H. acid 2 cc 2 pm
at 12:30 turn off heat for over Sunday
M.G.

Ent'd P.M. MAY 20 1912

Boil together
Xylidine (greater portion)
E. Bridgewood Linden experiments
and Ether
Vaseline Acetic acid

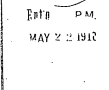
5:00 P.m. # 5-20-12-# 2
Xylidine 10 cc Heat 240° 1 hr
2nd " " 8 " Tough
Metaldehyde 10 cc 230° " 2 cc
Para Cl. aniline 10 gm. when cold is Black
Brittle

Ent'd P.M. MAY 21 1912

Para Cl. aniline
Sulphur
Shellac c -
Result Rosin-like Mixture - not
Sticky - most tough.

Ent'd P.M.
MAY 22 1912

Red Aniline Acid
Sodium Phosphate Tri-basic
Hydrated acid — No Go.



Ent'd P.M.
MAY 22 1912

Stearin-amber about 1
Para Cl. Aniline " 1
produces a nice wax-like mass
Acid Shell — (Plain)

Ent'd P.M.
MAY 22 1912

| | |
|---|---|
| Stearin-amber | 3 |
| Picric Cl. Nap. | 2 |
| Para Cl. Aniline | ✓ |

Stearin-amber 3
Para Cl. Aniline ✓
Makes good cutting Wax
Try again

Wax

Ent'd P.M.
MAY 22 1912

| | |
|---|---|
| Picric Cl. Nap. | 3 |
| Picric. Nap. | 3 |
| Shellac — 7-17-12-47 | 5 |

Ent'd P.M.
MAY 23 1912

| | |
|---|---|
| Picric Cl. Nap. | ✓ |
| Pyrogalic acid | 1/4 |
| Naphthylamine | 1/2 |
| Shellac about | 2 |

Condense in few minutes
the Pyrogalic acid is the agent

Picric Cl. Nap. ✓
Benz. Phenol 1
Shellac 2 ✓
Condenses to Elastic solid
No Bubbles

# 5-23-12-#1

Picric Cl. Nap. ½
Naphthylamine 1
Shell ✓

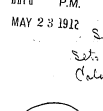
Set Hard Temp. around 240°
Kettle quick Pour off at 1.30 — Temp 162° with Cover
Smooth Set, Cold irregular color + cryptals on top.

#5-23-12-#2

Tetra-el. Naph- 5
Naphthylamine 1
Shellac 5

Temp around 240°

Sets cold irregular color & mystaks on top
Sets hard & brittle quick enough
Color lighter than #1



Naphthylamine 5
Shellac 3

Filter at 260° Remelt - bottle - annoy
Temp 240° - very fluid - No Bubbles except at finish.
added very little camphor & continue

Naphthylamine 5
Stearic Acid 2-1-1-1-1-1-1-1-2

Naphthylamine 6
Stearic acid 1-1--2-4

#1-23-12-#3

Naphthylamine 5--1--1--1--2
Camphor 2--2
Shell-- 6-1-2-1-1

14th at 145 add Shell- 2--2.
Pour off at 5:15 - Some Bubbles - Sets Half-hard when cold

Reviews of

Shellac mixtures recently made - the numbers referred to are recorded in ordinance under dates - #

#5-9-12-#4A is Para-chloranisine with acetic-Ether Solution of Shellac & filtered thru acetic-ether evaporated - after the Soap has been heated long enough to evaporate Volatile matter to the limit which is judged by the Viscosity of the dope - after cool did not set to a soft plastic putty-like mass - which becomes only little harder after 14 days.

#5-10-12-#6 - Sample #5 the addition of Tetra-chlor-Naphthalene reduces the putty-like mass to a wax-like-but still too-plastic for proper consistency - Gummy - at 80° temp.

#5-9-12-#3 - this day sample is Hard & brittle - try Again

#5-11-12-#2

Acetic-ether-Sol. Shellac with Para chlor-anisine & Dinitro-naphthalene produces a soft gummy Elastic mass -

Ent'd P.M. MAY 23 1912
Ent'd P.M. MAY 24 1912

Entd P.M. MAY 24 1912

#5-9-12-#1
Parachlor-aniline with plain Shellac producing a firm soft elastic mass - but not so soft as with the acetic ether-sol. shellac

#5-11-12-#3
Parachlor aniline with stearic-paraffin and acetic-Ether sol. shellac produces a clear mass which sets hard - but becomes soft at 80° temp.

#5-10-12-#3
Parachlor aniline filtered shellac with with stearic acid & Tetra Cl. Nap produces a compact soft elastic Mass - But not gummy - at 80° can be bended back & forth without fracture Might make good wire insulating Material

#5-9-12-#2
Ortho-chlor-Aniline with plain shellac at temp. 280° after 3 hours pour off on glass and allow to evaporate on steam table produces a clear Hard tought Mass

Entd P.M. MAY 24 1912

#5-13-12-#1
ortho-Cl-aniline with Shellac temp. 410° if heated for 10 hours the Mass will not set hard on cooling - nor will it harden after 10 days - remains semi-plastic and a shade gummy -

#5-14-12-#4
Aniline Blue oil with plain Shellac Boil for 2 hrs sets to Hard glassy brittle mass with Bubbles

#5-14-12-#7
acetic-ether sol. shellac dissolved in xylidine and add stearic acid & Tetra Cl. Nap produces a wax-like-gummy-coarse grain-mass

#5-15-12-#2
Anisidine with Shellac produces a soft gummy-mass which does not harden after 10 days

Ont'o P.M. MAY 24 1912

# J-15-12-#5
Nitro xylol with Plain shellac produces a mass very much the same as melting plain shellac and allowing to cool - contains all the Bubbles

# J-15-12-#1
Paraldehyde with Plain shellac produces a soft Rubbery to soft-horny mass - clear - with Bubbles

Methyl-aniline with Plain shellac produces a mass much the same as plain shellac melted & allowed to cool except that it is not quite so brittle Contains much Bubbles

# J-23-12-#3
Naphthylamine & Camaba with shellac produces a Hard dry brittle waxy mass - with fine grain that seems to not discolor - Requires a few hrs. become hard after poured
Try again

Ont'o P.M. MAY 24 1912

# J-23-12-#1
Penta cl. Naph. & Naphthylamine with Shellac produces a Hard - fine texture - brittle mass - Cuts some like Carnaba wax - has no thoughness nor Elasticity - nor Plasticity - Sets cold having fine grain and even surface - at 80° temp can hardly dent with finger-nail

# J-23-12-#2
is the Same except that Tetra-cl. Naph was used and produced at finer grain structure and is a shade more plastic than when Penta-cl. Naph. is used - other-wise the same -
If the brittleness can be reduced without making it gummy nor Plastic nor overelastic this Dope would probably answer
Try on

#5-24-12-#1

Tetra Cl. Map 5
Naphthylamine 1/2
Shellac at 3.30 5

Ent'd 2:00 P.M.
MAY 24 1912

Temp. 260° Pour off at 4.10
Show Lettering Bubbles when in liquid state, when cooling shows fine crystals in the next day - inspection shows a grainy structure too coarse — and too brittle to cut a shaving —

#5-25-12 #3

Tetra. Cl. Map - 5
Dinitro Map. 4
Shellac - 6

Ent'd P.M.
MAY 25 1912

Pour off at 11.00. temp 320°
This Dope Has been a most difficult one to finish on this Paper as crystallization is too coarse

#5-25-12-#1

Tetra Cl Map - 5
Dinitro - map 5
Shellac 6

Ent'd P.M.
MAY 25 1912

Temp. 270-300°
at 10.00 Pour off through Rec. Cotton [illegible]

#5-25-12-#2

Tetra - Cl. Map 5
Stearic acid 2
Dinitro - map - 5
Shellac 8
Temp. 270-300°

left to cool over night

#5-25-12-#4

Tetra Cl - Map - 5
Dinitro Map. 3
Shellac 6

Ent'd P.M.
MAY 25 1912

Pour off at 12.05 - Temp - 318° Fillers on mist crystals uniformly coarse shows up which eventually blends to a solid Color

Ent'd P.M.
MAY 27 1912.

# 1 2 3 4

Nitro el. Nap — √
Dinitro Nap — 2
Shellac — 6

Temp. up to 330° - let lower to 320° 4 Jets

Cannabarom. √
Naphthylamine ½

# 2

Steam-Menthol √
Dinitro-Naphth 2
Shellac 6

Temp. 320° - let lower to 300° Bubbles - let lower to 240° then the wax separates out - Mpk.

# 3

Vertical. Nap √
Dinitro-Nap 2
Acetic Ether Sol. Shellac 6

Temp 260° Condenser before all Bubbles are eliminated

Ent'd P.M.
MAY 27 1912

# 4

Nitro el. Nap — √
Slow Steam-Co 5
Parachlor-anisine 3/4
Shellac 10

Raise temp. 300° Yield Shell.
at 3:50° Temp. 310° at 4.50 Surface is full of foam and has to be removed

# 5

Steam-Menthol 2½
Naphthylamine 1
Shellac 3-½

Very few Bubbles, temp 290° at 4.30 Poor yield - time was some few Bubbles, could not keep heated longer on account of thickness

Try Steam-menthol - Benzamidine + Shellac - over

Ent'd P.M.
MAY 28 1912

#5-28-12-#1

Stearinamine ..... 2
Benzamidine ..... 1
Slow Sterate So - ..... 1
Shellac ..... 4
Temp. around 150°

at 2:15

#5-28-12-#2

Stearic acid ..... 5
Pyridol Camphalin ..... 4 5
Ed. Cuentic Co. Beleguicol 4 oxytalyzed ..... 1/4
Temp. 310°. at 3:45 - skim off the Bubbles

Ent'd P.M.
MAY 28 1912

5-28-12-#3

Orthochloranthine ..... 30 cc.
Shellac ..... 15 grms.
Temp. 300° filter through linnin & cotton into white dish - put over flame to Evaporate at 6. P.M. left to cool over night
294 put over flame again - at 9-45 was very thick and elastic - Rubbery and full of bubbles - added
Slow sterate So - ..... 3 grms.
Tutra-Chloride - ..... 9 "

Ent'd P.M.
MAY 28 1912.

#5-28-12-#4

#5-28-12-#2 ..... 3 parts
Plain Shellac ..... 3 "
Put mix.

#5-28-12-#5

Stearic Acid ..... 6
Naphthalene ..... 3
Shellac ..... 4
Sal. So - ..... 1/4
Temp. around 300° - let cool overnight
29th at 9.00 am. add Shellac ..... 1-1

Ent'd P.M. MAY 26 1912

# 5-29-12-#1

Make Solution of Shellac in
Sol. Caustic Soda - Saliginized - the liginol
proportion 1 liginol to
Water 1 gt.
Shellac 2 oz

Dissolve with assistance of Heat 120°
& filter through 8 thickness of Cheesecloth into
Hydrochloric Solution of water
1 gal - Acid 1/2 oz

at 11.50 # 5-29-12-#2

Sol. Caustic Soda - Saliginized 1/2 liginol
Water 1 gt
Shellac 2 oz
Dissolve at 120° - at 12.40 add another gt water
at 1.05 filter
Hydrochloric Acid 1/8 oz
Water 1/2 gl.
was not enough - make another 1/2 gl.

Ent'd P.M. MAY 29 1912

# 5-29-12-#3

Water 1 gt
Sol. Caustic Soda - Saliginized 1/2 oz. Crystals
Shell 2 oz
Dissolve temp. 120°

Hydro chloric acid 1/4 oz
Water 1 gl

Ent'd P.M. MAY 31 1912

# 5-31-12-#1

Water 1 gt
Sol. Soda water crystals 1 oz
Shell - 2 oz
Water 1 gl
Common Salt 6 oz

# 2

Water 1 gt
Sal Soda water crystals 1/2 oz
Shell - 2
Temp - 140°
Water 1 gl
Common Salt -1-2 oz
Make Hot 140° and turn Shell-sol. into
Kwik's is not the same as when salt sol. is cold. when hot the kwik comes out
little chunks

#5-31-12-#3

Ent'd P.M. MAY 31 1912

Water 1 qt
Sal. Soda water crystals ½ oz
Shellac 2 oz

at 2.10 water-sol. sola. was 140°
add the Shellac

Water 3/4 qt
Tartaric acid 3/4 oz

Turn Shell sol. into tartaric sol & filter - spread on paper to dry in oven

Sal. Soda Solu. of Shellac same as proportions above and precipitated with acetic acid, the shellac holds the acid so strong that 4 weeks evaporation will not eliminate it - and the lac remains sticky

Sal. Soda Solution of Shellac same proportions as above and precipitated with common salt - then washed in Sulphuric acid Solution about 2% produces a creamy powder very fine and is insoluble. will become plastic

#5-31-12-#4

Ent'd P.M. MAY 31 1912

Water .295
Salsoda, water crystals 1 oz
Shellac 4 oz

temps 140°

Water 2 qts
Tartaric acid 1½ oz

Have acid solu. little warm - and turn shell-solu. into it from the filter and stir. it seperates in granular form it may then be allowed to dry in open air or slightly heated - or it may be put into boiling water - the gum melts and completes the water ext. after 15 mi boiling - is allowed to cool and beets hard - like Original lac. little darker color.

Sal. So. Solu. of shellac precipitated with an inorganic acid like Hydrochloric attacks the lac gums enough to darken them a dark brown - and will only become plastic.

I consider it to be novel to precipitate a Soda Solution of shellac with a fixed organic acid such as tartaric acid; the process is very simple and inexpensive and there is no traces of Soda or acid that remains after washing.

Ent'd P.M.
JUN 1 1912

## #6-1-12#1

Tetra 3
Stearic 2
#5-31-12-#3 5

Temp. Raised around 230° - much bubbling at first which disappeared almost completely after 2 hours some gum shows when stirring - which comes from the bottom. Pour off at 11:45 - Coarse grain - waxy

Stearic 3
Naphthalene 1½
Sheelac #5-31-12-#4 5

Ent'd P.M.
JUN 3 1912

Stearic Acid 10
Salt Soda crystals 1-1-1-2-1½
#7 Water
Tartaric acid N.G.

## #6-3-12-#1

#5-31-12-#2 (3 parts)
Stearate of Soda (Kahr, stock) boiled in water - add solution of Tartaric acid - let boil & time off liquor and evaporate water - (2 parts)
Does not melt to liquid -

## #6-3-12-#2

Tetra cl. Nap- 3
#5-31-12-#3 4

Grainy - Brittle
Hard to Melt. Temp. 230° - full of tiny bubbles
Sample on glass pot stand on heating
add #5-31-12-#3 more 4
9 Ponta cl. anilene #
Bubbles add another Tetra cl. Nap- #
Bubbles add another Ponta cl. Anilene 1 #
" Tetra cl. Nap- #
Still there are Bubbles - Temp. 250-260°

Tetra cl. Nap - #3 3
#5-31-12-#3 4
Ponta cl. anilene 1
Temp. went up to 360° - add another Tetra 1

Temperature too high - Condensed

# 6-3-12-#4

Tetrachlornaphthalene Boiled into Tartaric solution in water

# 6-3-12-#5

Tetrachlornaphthalene Boiled into Sal-Soda Solution

# 6-3-12-#6

| | |
|---|---|
| Punta Cl. anthrin | 1 |
| # 6-3-12-#4 | 3 |
| # 5-31-12 #3 Shellac | 4 |

Temp. around 240°-270°
Some Bubbles - could not eliminate the tiny Bubbles
Product - Grainy - too brittle - Hard enough - Wax like - Not plastic

# 6-3-12-#7

| | |
|---|---|
| Punta Cl. Anthrin | 1 |
| #6-3-12-#5 | 3 |
| # 5-31-12-#3 Shellac | 4-½ |

Bubbles - But less than Plain Tetra
Raised temp. to 310° to make more liquid that did not eliminate the tiny Bubbles
Comeads off ½ the quantity and add Stearic acid to the balance, that clears off very much of the Bubbles - But makes the Product too soft - after 24 hrs. Graing - would make

# 6-3-12-#8

| | |
|---|---|
| Synthetic Camphor | ½ |
| # 6-3-12-#5 | 3 |
| Shellac # 5-31-12-#3 | 4 |

Temp. 210°-260° Bubbles

# 6-3-12-#9

| | |
|---|---|
| Synthetic Camphor | ½ |
| Stearic | 1 |
| #6-3-12-#5 | 3 |
| Shellac # 5-31-12-#4 (water treated) | 5 |

Temp. 240°-260° - makes much thinner Product
Thru the combination of treated shellac + add of #5-31-12-4 — Comes much less Bubbles at 240° thickens and Bubbles - Pour off. Plastic + Graing

Rec'd P.M.
JUN 1912

#1 6-4-12-#1

Water 8 oz
Sal. So - crystals 1/4 oz
Shellac 1/2 oz

Boil about 1/2 hr. then pour into Tartaric acid Sol - warm - then wash and Bring to boil in plain water - Evaporate water.

#6-4-12-#1 - with Aniline Dat Black - would not prevent Bubbles - add a little treated Shellac Wax - Slow Hardening - Makes Excellent Cutting Quality Wax - But Bubbles

#6-4-12-#3

Water 8 oz
Sal. Soda 1/4 oz
X Bring to boiling point
in another Mountain wax 1 oz

#6-4-12-#4

1st { Water 4 oz
Tartaric acid 1/16 oz
Mountain 1 oz

2nd Water 8 oz - Sal-so - 1/2 oz - boil. Remove 2nd into 1st - then wash by boiling in water twice - forms a kind of soap - light & chalky

#6-4-12-#5

#1 { Water 4 oz
Tartaric acid 1/8 oz
Mountain 1 oz

#2 { Water (Not made 8 oz
Sal So - 1/8 oz

#6-4-12-#6

Water 4 oz
Tartaric acid 1/16 oz
Paraffine 1/2 oz

Boil 4 add Sal-so-aal. with Water tried Shellac to it - will not mix

Rec'd P.M.
JUN 5 1912

# 6-5-12-#1

Melt Rosin in Tartaric acid
Solution & add Sal. Ro-Sal.
until Neutral - Hard brittle mass
Yellow-Gray-Color

# 6-5-12-#2

Melt Rosin in Sal. Ro-Sal.
Boil until fine Emulsion is formed. then
add Tartaric acid Solution is Neutral, the
product is a soft sticky mass - Yellow-Grayish

# 6-5-12 # 3

Mix #6-4-12-#4 lumps - before remelting
#5-31-12-#4 - lumps before remelting
produced Hard brittle mass.

Seems to work good in any proportion
when there is Shellac enough to overcome
the brittleness the Brife is to Viscous at 260°
Bubbles - add Ortho-Cl-anilene - that
makes Thinner and does not promote
Bubbling - Sets Little slow - Temp 250°-260°
Excess of addition of Ortho-Cl-anilene make the
Mass Rubbery - Plastic

Fine looking Specimens of Mixing Shellac
with a Wax -

Rec'd P.M.
JUN 5 1912

# 6-5-12-#4

Melt # 6-5-12-#2 5 Part
#5-31-12-#4 (Lumps) 3 "
Makes Hard Brittle Mass. - Rosin like
add Ortho-Cl-anilene - Bubbles much
add little Tartaric Acid to Neutralize - Sour Milk -

Looks like good wax imitation

# 6-5-12-#5
Melt #6-4-12-#4 —— 10-5
Stearic Acid —— 5
Stearic Stearate Soda —— 2
Shellac #5-31-12-#4 Sour Mix -

Looks like good Coating wax Imitation

# 6-5-12-#6
Glow Stearate Soda - 5
# 6-4-12-#4 10
Stearic acid 1
Shellac #5-31-12-#4 Sour Continues

Ortho Cl. Anil. 3
# 6-4-12-#4 6-1
Shellac # 5-31-12-#4
Would not compound, add a trace of Boric acid
it immediately Curdles.

Ent'd P.M.
JUN 6 1912

Tetrachl. naph. 5
Boric acid 1
Stearic acid ½
Dont Mix

Stearic acid 5
Boric acid 1
Dont combine

Water 4 oz
Boric acid ½ oz
Heat to dissolve

Stearic acid 10
Sal. Soda (saturated liquid) 1 oz — 1½
Water 1 oz
Water 1

Stir – it forms a creamy mass – tested was alkaline – make more
Boric ½ oz Water 2 oz – was still alkaline
Another Boric ½ oz Water 1 oz ½ oz Borax – was
still alkaline add Hydrochloric acid not –
until separation takes place

#6-6-12-#1

Water 4 oz
Soda Phosphate (tribasic) ½ oz
Shellac ¼

Dissolves to Reddish Solution –
Precipitate with Tartaric Sol. – if the acid
is weak the lac separates out in flakes
if strong in lumps or sponge-like
the Color is pink – when melted
has the color of Sesquioxide of Iron
the quality appears to be same as
the Plain Lac with its Bubbles

Mixes good with Tetrachl. Naph and
with Tetrachl. Naph. mixed with Stearic acid
Produces soap the right consistency – the
good shaving quality and comparatively
But the Bubbles also –

Stearic acid after Boiling in
Sodium Sulphite ¾
#5-6-12-#1 1

Rec'd P.M. JUN 8 1912

| | |
|---|---|
| Water | 2 oz |
| Sal. So- | 1/4 gr. |
| Oil Cedar | 1/2 cc. |
| Stearic acid | 1/2 gr |
| Shellac | 1 gr |

precipitated with Tartaric acid
add until neutral -
Evaporate water - Melt. Bubbles
and does not become liquid
the addition of little Tetra. El. Nap
makes it liquid and produces
a mass which does not set hard
on cooling - But is Rubbery

| | |
|---|---|
| Water | 2 oz |
| alcohol | 1 cc |
| Tetra El. Nap. | 2 gr. |
| Shellac N.S. Bubbles | 2 gr |

Rec'd P.M. JUN 10 1912

| | |
|---|---|
| Water | 4 oz |
| Tartaric acid | 1/8 oz |
| Montan after boiling 1/2 hr added 1/2 water more | 1/2 oz 2 oz |

| | | |
|---|---|---|
| #2 | Water | 6 oz |
| | Sal. So- | 1/8 oz |
| | Shellac | 1 oz |

Turn #2 into #1 . Stir was acid
add little So. sol to neutralize
and let come to boil and
wash

| | | |
|---|---|---|
| #1 | Water | 6 oz |
| | Sal. So- | 1/2 - 1/8 oz |
| | Montan wax | 1/2 oz |
| | Aniline Blue oil | 2 cc. |

Rec'd P.M. JUN 11 1912

| | |
|---|---|
| Water | 8 oz |
| Sal. So- | 1/8 oz |
| Shellac | 1 1/2 oz |

#6-11-12-#3

| | |
|---|---|
| Water | 4 oz |
| Sodium Bibrate | 1/8 oz |
| Montan | 1/2 oz |
| Shellac | 1/2 oz |

Boil - add Shellac & Montan in small quantities - first the shellac then the Montan, it will combine to form a thick Emulsion - let boil about 15 mi. - then add about 4 oz more boiling water and let boil another 1/2 hr. - Add Montan ——— more 1/2 oz let dissolve & filter through fine linnen there was a considerable amount of matter that remained on the filter, a mealy-sort of stuff resembled it and found it was a mixture of the Shellac & the wax it would not melt to a liquid a portion simply soften in lumps the other portion a way -

thro down with Tartaric acid solution - the filtered portion it gathers in sponge - like lumps - wash with boiling water - After 24 hrs cooling allows Expulsion of Montan Wax

Melt some Parael. ammine and some #6-11-12-#3 allow to condense to proper hardness will #6-11-12-#3A

---

Slow Step. So - with #6-11-12-#3
will #6-11-12-#3B
Dont seem to combine well, a little lumpy But very smooth cutting quality - too much wax, good smooth effect to touch

| | |
|---|---|
| Water #6-11-12-#4 | 6 oz |
| Sodium Bibrate | 1/8 oz |
| Shellac | 1/2 |

Entr'd P.M.
JUN 11 1912

| | |
|---|---|
| Water | 10 oz |
| E. Caustic Soda | 3 3/4 |
| Mowrah wax | 1 oz |

Saponification was not complete. Successful — work not dissolved in water to compact solution remains grainy —

| | |
|---|---|
| Water | 20 c.c. |
| Egyptian alcohol | 2 c.c. |
| E. Caustic Soda | 20 grms. |
| Mowrah wax | 20 grms. |

Entr'd P.M.
JUN 12 1912

# 6-12-12

| | |
|---|---|
| Water | 4 oz |
| Sodium Bicarbonate | 1 " |
| Shellac | 2 " |
| Mowrah Boil for ½ hr. & add | ½ " |
| Stearic acid | ¼ " |

Stir well, this addition thickens the solution and sets quickly on cooling to the sides of the pan — looks like proper combination

Take off the fire — let cool —

Make Tartaric acid Solution —

Water 2 oz Acid ½ oz

This amount makes solution acetous

1½ g of the acid solution diluted with 10 g water brings up a waxy material — filter and keep separate

Add more acid to the filtered liquor ½ g acid to 1½ water — more waxy material is brought up — similar to the 1st

Add ¼ g more of acid diluted with 3 g water more flakes is drawn out of solution — filter this time the stuff is much more compact and resin like in color

Add another ¼ acid — not much effect add more and this time a fine powder-like material is precipitated

Over

Melt some of the 1st filtered - add little water - some mountain seperates out to float the gum stays down after few minutes an emulsion is formed again - thro it out

Remelt more of 1st filtered & let water evaporate out - a dark scum floats on top - tested it and is not plain Montan - is gummy enough to form threads when the water is all off the mass will not liquify thin enough to pour, does not Bubble much - but holds together like paste - The adition of stearic acid does not combine to make more fluid - it lumps the gum and forms a seperate portion which is liquid the right consistancy. poured off some of the fluid portion - after set and cold poured it to dry of Excellent Quality it Cuts a fine Smooth Shaving Extremely Compact with Number # 6-12-12 #1A

Ten hours later the Sample has altered from hone-like cutting quality to a brittle-dry

Melt some # 6-12-12-#1 when portion of the water was evaporated still bubbling much - add about 1/2 a-to-in excess after bubbling has disappeared tested a sample when cold, show to be Montan like quality hard & brittle - coarse grain - a little some more # 6-12-12-#1

6:15 PM try to dissolve # 6-12-12-#1 with liquids
# 6-12-II #1 Xylidine
# 6-12-II #2 Acetone

Ent'd P.M. JUN 13 1912

# 6-13-12 #1

| | |
|---|---|
| Water | 40 cc. |
| Bibrate Borax | 1 gr |
| Japan wax | 1 |

Boil 10 min. keeping to stick to bottom account of thickning

| | |
|---|---|
| add more water | 80 cc |
| Bring to Boil - add Shellac | 1 1/2 gr |
| Boil 15 min. add gradually | |
| Cold water | 50 c.c. |

this liquify the Solution so much that the unemployable matter is driven to float on top - melt this matter and weigh - Jap wax 13 gr and hard matter #4 9 - Seperate the Solid from Solu with Tartaric acid. Stronger in acid is required

#6-13-12 #2

Ent'd P.M. 6-13-12 #2

JUN 13 1912

| | |
|---|---|
| Water | 2 oz |
| Biborate Soda | 1 oz |
| Yellow Cerasin | 1 oz |
| E. Caustic Soda | 3/16 gr |

Here a seperating is effected a cerasin like wax and a Wax Hard Gum - Soluble in water.

#6-13-12 #2 B

| | |
|---|---|
| In other Pan Water | 6 oz |
| Biborate Soda | 1/4 oz |
| Shellac | 1/2 oz |

Bring to boil & filter. Makes emulsion that does not seperate, hot or cold. Make Solution 1/2 oz. formic acid. Water 1 pt and precipitate & filter & Dry will make #6-13-12-#2 B.

| | |
|---|---|
| Water | 1 oz |
| Biborate Soda | 1 oz |
| Stearic Acid | 1 1/2 |
| E. Caustic Soda | 3/16 |

Mix.

| | |
|---|---|
| Dinitro Naphthalene | 5 gr |
| Cerasin | 5 gr |

| | |
|---|---|
| Dinitro Naph- | 1 " |
| Stearic acid | 1 " |
| Shellac #6-12-12-#1 | 3-5-5-2 |
| Naphthalene | 2 |
| Tetra chl. Naph- | 2-2 |
| Naphthalene | 2-1 |
| Dinitro Naph- | 2 |
| #6-12-12 #1 | 4-3 |
| Slow Stain - Soda | 1/2-1/4 |
| Tetra-chl. Naph | 2 |

Gummy - Coarse Grain

#6-17-12 #

Ent'd P.M.

JUN 17 1912

| | |
|---|---|
| Carnauba Blue acid | 3 cc |
| Stearic acid | 1/2 gm. |
| Soda - Soda | 1 " |
| warm Water | 40 cc |

| | |
|---|---|
| #2 Water | 6 oz |
| #2 Soda - Biborate | 1/4 oz |
| #2 Shellac | 1 1/2 oz |

mix #1 with #2 - combines

| | |
|---|---|
| #3 Water | 1 pt |
| #3 Formic Acid | 1/2 cc |

Separate from Solution with #3 - filter & Melt - Bubbles - Hard and tough emulsion to Alum Shellac

| | |
|---|---|
| combine Blue Acid | 3 cc |
| Stearic acid | 5 gm. |
| Soda Soda - | 1 " |
| Water - Hot - | 50 cc |

Don't combine

Rec'd P.M.
JUN 17 1912

Bark Cannabis 5 cc
Edis. Canastic So- 5 "
Water 100 cc

Boil — add #6-19-12-#3.
Boil - Separate with formic acid
Dil. filter - Melt - Dont combine

Montan 5 cc
Lab. Stear-So-(Powdered) ½ "

Montan 8 cc
Cannabis 2-3
Ceresonte 4
Lab. Stear-So- 1

Temp - 380° add the Stearic Then up to 410°
clears in about ½ hr.

Stearic acid
fuid ad
+ Shellac produces a
Rubbery mass. might answer
as a substitute for Rubber used in
Mfg of celluloid Records

Rec'd P.M.
JUN 18 1912

# Coagulation of Shellac

The following Experiment seems to prove that an acid will coagulate Shellac —

#6-18-12-#1

Dissolve shellac in 1½ oz
Bi borate of Soda ⅛ oz
in Water 6 oz

when well dissolved separate the shellac from the solution with very weak sulphuric acid solution —

melt the sotreated shellac — if all the acid is not all washed out it Coagulates very quickly — if the treated shellac is washed with weak alkaline solution (Carbonate Soda) it will not coagulate so quickly in fact some has been over heat at 340°-360° F. for 2½ hrs. it bubbles but does not seems to thicken much with prolonge heating.

MONTANA STATE COLLEGE
Bot'd P.M.
JUN 19 1917

#6-18-12-#1 2 Parts
Yellow Cl. Wax 2 "
Does not Combine – mixes by brisk stirring and sets hard enough – But coarse grain – the proper horny cutting granularity is withheld – and may be obtained more or less hard by more or less rapid cooling – there are Bubbles when in fluid state consequently they appear in the Dope when it is cooled and set

In Every Case I have observed that when the Dope is in fluid state if there are bubbles no matter how small the resulting mix when cooled and set shows a coarse grain – unsuitable setting of the ingredients or crystalizing or hardening of the mass is not simultaneous which results in the coarse grain or what appears to be so with Magnifying Glass – such mixtures are unsuitable – the cutting Stylus does not cut without chipping mixes and reproduces the same –

#6-18-12-#1 2 Parts
Stearic acid 2 "
Does not Combine – mixes with brisk stirring, sets when cold more or less hard but not quite the same tenacity – is little more wax-like when more stearic acid is added a rubbery mass is the result – which remains Elastic a considerable time

#6-18-12-#1 2 Parts
Stearic acid & Yellow Cl Wax in Various proportions does not combine mixes by brisk stirring and the Dope when cold & set produces a more or less hard tough mass much similar to the mix of carnauba Stearic acid & Yellow Cl. Wax & shellac –

#6-18-12-#1 — with wax as will mix after long heating & stirring and coagulate the shellac as combination takes place – can not recollect fluid have tried Carnaba wax. Montan & Bay Rum Japan wax – Spermacitin – Ceresin & Paraffin – will not combine nor mix by brisk stirring

# 6-18-12-#1 with fuel oil combines and becomes fluid will take up any amount - the more oil is added the more elastic is the resulting dope

## # 6-19-12-#1

Commercial Blank wax — 2 Parts

A # 6-18-12-#1 — 2 "
Dont Combine -

with Para phenetidin

B Combines to form a Sticky mass
Sticks to anything

with Butylic alcohol

C Combines to form Rubbery mass
Dissolves slowly

with Paraphenetidin & Carnaba wax

D combines - wax thickens it and make mass less sticky but not firm enough -

with Paraphenetidin + Stearic acid

E Dissolves with evolution of gas Combines - Clears forms fair mass - little sticky - Try again

F with Paraphenetidin & Lettuce el. Wax
combines - forms soft pliable mass
T.L.D. Burned Cools deposits to grainy structure on cooling

G With Paraphenetidin & Graphite wax
Does not combine

H with Paraphenetidin & Comm. Blank wax
Mixes, with much circulation as gas
Tendency to form Bubbles at finish if stirred

I with Paraphenetidin & Bay wax
Mixes very slowly Dont Combine
Separates absolutely on cooling

J With Paraphenetidin + Mastic wax
Dont mix

K With Paraphenetidin 3 cc
commercial Blank wax 2 gm.
Heat bath temp 350°-370° - Covered to Condenser Vapors - Pour off and let cool -
take of this 2 Parts
# 6-18-12-#1 2 "
temp 240° - ½ hr. When cold mass is soft & pliable

See Next Book

Enrd .M.
OCT 1 6 1910

Pattern Nos 668-L,
664-L, & 667-L
for Casting Machine

Enrd .M.
OCT 14 1910

Pattern # 669-L
for Melting Box

Pattern #668-L Base
for Melting Box.

Enrd .M.
SEP 29 1910

Composition Castings from
Patterns Nos 656-L & 657-L
658-L & 660-L

Enrd .M.
OCT 4 1910

Iron Castings from
Patterns Nos 661-L
662-L
663-L
664-L

Patterns for Large Record, (Grand.)

? Change No.

Pattern #107-E for Head-stock of Undoing and Coating Machines

Entd M
SEP 14 1910

Patterns # 122 E Lab # 128 E Lab
And # 124 E Lab

Entd M
SEP 21 1910

1 Iron Casting from Pattern # 658-L

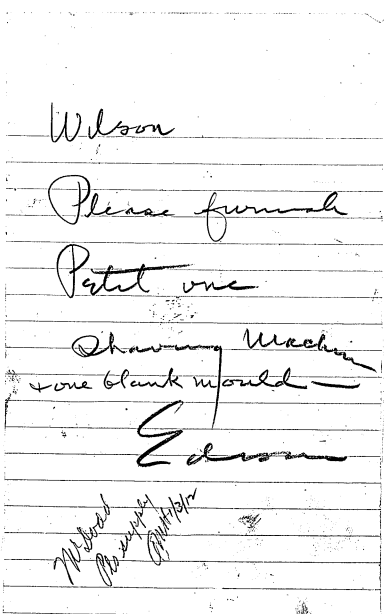
Entd M
SEP 27 1910

Chlorination Dope Samples Names:

Halo Wax #160 Yellow — is Hexa Cl. "wax"

" " #60 Black Red. " ".

[ITEM FOUND IN BOOK]



[ITEM FOUND IN BOOK]

Pstat = anything you want made I will push it thru

Stan

Stone 4 8 10
So " 2
" 1/2 1 2 1/2

Stone 100 1st
" So 75 Temp 300°
Remelt Temp 400

Stan 10 2-9
" So 2 Temp 350°
Remelt Temp 460°

Stan 10 #3
" So 1 1/2 Remelt 2400

#4
Stan 10 #4
" So 4
melt So 1st add little Sta to start
3200